UNIVERSIDADE LUSÍADA
LISBOA

Course Unit Program
Physiology of Effort

Academic Year 2025/2026

1. Organic Unit

Faculty of Business and Economic Sciences

2. Course

Sport Organization Management

3. Cycle

1st

4. Course Unit

Physiology of Effort (C1112)

5. Scientific Area

6. Curricular Year

2nd

7. Type of Curricular Unit / Semester

2nd Semester

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8. Class type and workload (work time)

Theoretical classes:	
Practical classes:	
Theoretical-Practical Classes	30,00
Tutorial Guidance:	20,00

9. ECTS Credits

6,00

10. Scientific Area Coordinator

11. Regent

Prof. Doutor TIAGO ANDRÉ FREIRE DE ALMEIDA

12. Assistants

13. Teaching Language

Portuguese

14. General Objectives

This curricular unit aims to develop skills and knowledge in the area of human physiology, with emphasis on adaptive processes related to physical activity in the execution of motor tasks in stress situations. It is intended to develop an integrated knowledge using them in the formulation, resolution and discussion of problems in the area of training and student intervention.

15. Specific Objectives

- Know the assumptions and concepts associated with the physiology of effort.
- Understand the adaptive response processes related to the performance of an integrated motor task performance system.
- Understand the organic functional changes induced by exercise.

16. Skills to be acquired

- Know and explain the concepts associated with the Physiology of Effort in physical activity.
- Understand the adaptability of different biological systems when subjected to different training stimuli and environmental conditions.
- Interpret the physiological parameters in relation to the monitoring, control and evaluation of the training process.
- Know and explain the adaptive processes that physiologically arise in response to the developed effort.

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17. Teaching Methodology

Classes take place on a theoretical-practical basis. In theoretical classes, the subject is exposed along with illustration with practical examples. In the practical classes, there are forms, application of the procedures and protocols studied in the theoretical-practical classes.

18. Course Unit Program

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1. Concepts of Physiological Adaptation
1.1. Concepts of adaptation, homeostasis, and heterostasis;
1.2. Stimulus and motor action: functional load, stimulus-adaptation relationship;
1.3. Biochemical and genetic mechanisms of adaptation;
1.4. General adaptation syndrome to stress;

2. Bioenergetics and Muscle Metabolism
2.1. General principles, thermodynamics, and energy conservation;
2.2. Energy processes:
2.2.1. Alactic anaerobic;
2.2.2. Lactic anaerobic;
2.2.3. Aerobic;
2.3. Metabolic adaptations: energy reserves and increased enzymatic activity;

3. Respiratory and Pulmonary Adaptations;
3.1. Ventilatory function and lung volumes;
3.2. Maximum oxygen consumption, anaerobic threshold, respiratory quotient, and ventilatory equivalents;
3.3. Respiratory variables applied to exercise physiology;

4. Cardiovascular Adaptations
4.1. Cardiac function, cardiac output, heart rate, and systolic/diastolic volumes;
4.2. Blood pressure, vascular resistance, and circulatory regulation during exercise;
4.3. Adaptations to different types of exercise;
4.4. Basic concepts of exercise electrocardiography and applied cardiovascular variables;

5. Neuromuscular Adaptations
5.1. Types of muscle contraction, force/velocity/power;
5.2. Types of fibers and motor units: implications for exercise;
5.3. Functional overload, adaptation, and hypertrophy;
5.4. Coordinative processes, muscle remodeling, and physiological interpretation of hypertrophy;
5.5. Energy reserves and protein resynthesis;

6. Fatigue and Performance
6.1. Concept, types of fatigue, and prevention;
6.2. Overtraining, overuse, injury, and musculoskeletal pathophysiology;
6.3. Sleep as a factor influencing physiological responses and performance;

7. History and Assessment in Exercise Physiology
7.1. Brief history of exercise physiology;
7.2. Athlete assessment protocols and physiological monitoring;

19. Assessment Methods

Follows the RGAC currently in force at Univ. Lusíada - Lisboa.

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20. Didactic Resources

The course work will be conducted using specialized literature, multimedia presentations (e.g., PowerPoint), and interactive study materials, complemented by resources made available on the Moodle platform.

21. Sustainability Objectives

SDG 3 - Good Health and Well-being: Promote knowledge about physiological responses to exercise and organism adaptation.
SDG 4 - Quality Education: Raise awareness of the importance of health, recovery, and sleep in performance, ensuring understanding of scientific principles applicable to assessment and planning.
SDG 8 - Decent Work and Economic Growth: Apply exercise physiology knowledge to the management of physical and sports activities, promoting efficient and safe practices.

22. Keywords

Physiology
Effort
Stimulus
Adaptation
Bioenergetics

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23. Main Bibliography

Author(s):	William D. McArdle, Frank I. Katch, Victor L. Katch		
Title:	Fisiologia do Exercício: Nutrição, Energia e Desempenho Humano		
Edition:	8th	Year:	2016
Local:	Rio de Janeiro		
Publisher:	Guanabara Koogan		
ISBN Code:			

Author(s):	Powers, S. e Howley, E.		
Title:	Fisiologia do Exercício: Teoria e Aplicação ao Condicionamento e ao Desempenho,		
Edition:		Year:	2000
Local:	São Paulo		
Publisher:	Editora Manole		
ISBN Code:			

Author(s):	D. Costill,W. L. Kenney Dr. J. H. Wilmore		
Title:	Physiology of Sport And Exercise		
Edition:	6th	Year:	2015
Local:	UK		
Publisher:	Human Kinetics		
ISBN Code:			

24. Complementary Bibliography

Author(s):	Foss, M. e Keteyian, S. Fox.		
Title:	Bases fisiológicas do exercício e do esporte.		
Edition:		Year:	2000
Local:	Rio de Janeiro		
Publisher:	Guanabara Koogan		
ISBN Code:			

Author(s):	Terry J. Housh, Dona J. Housh, Herbert A. deVries		
Title:	Applied Exercise and Sport Physiology, With Labs		
Edition:	4th	Year:	2016
Local:	UK		
Publisher:	Routledge		
ISBN Code:			

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Ficha técnica MIP / MIP Datasheet	
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Autor / Author	Prof. Doutor TIAGO ANDRÉ FREIRE DE ALMEIDA
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